

computer produces said second image and said haptic feedback signal based at least in part on information received from said first computer.

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2. (amended) A networked haptic feedback gaming system as recited in claim 1 wherein said first computer produces said first image and said haptic feedback signal based at least in part on information received from a second computer and based at least in part on said first computer input, and wherein said second computer produces said second image and said haptic feedback signal based on information received from said first computer and based on said second computer input.

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3. (amended) A networked haptic feedback gaming system as recited in claim 1 wherein both said first computer and said second computer are network access computers which communicate over said network using TCP/IP protocols.

4. (amended) A networked haptic feedback gaming system as recited in claim 3 wherein said first computer sends information to a Uniform Resource Locator of said second computer.

5. (amended) A networked haptic feedback gaming system as recited in claim 1 wherein said first interface device includes a user manipulatable object for receiving input from said user, said user manipulatable object being movable in two degrees of freedom.

6. (amended) A networked haptic feedback gaming system as recited in claim 5 wherein said first interface device includes a local controller that communicates with said first computer, a plurality of actuators for providing said tactile sensations, and at least one sensor for sensing positions of said user manipulatable object

7. (amended) A networked haptic feedback gaming system as recited in claim 5 wherein said user manipulatable object is receptive to a finger of said user for manipulating said user manipulatable object in said two degrees of freedom.

8. (amended) A networked haptic feedback gaming system as recited in claim 6 wherein said haptic feedback signal includes a haptic feedback command that can be parsed by said local controller such that said controller can control said actuators in response to said haptic feedback command in a control loop with said sensors.

9. (amended) A networked haptic feedback system comprising:
first computer means coupled to network means; and
second computer means coupled to said network means, said second computer means including visual display and human/computer interface means, said second computer means

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further including means for displaying an image on said visual display means, said second computer means further including means for interpreting visual information and feel sensation information repeatedly transferred to said second computer means from said first computer means over said network means, updating said image from said visual information, and associating said feel sensation information with said visual information, said second computer means further including means for developing physical feel sensations at said human/computer interface means using said feel sensation information, wherein said physical feel sensations are produced using actuator means included in said human/computer interface means.

Please cancel claim 10 without prejudice.

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11. (amended) A networked haptic feedback system as recited in claim 9 wherein both said first computer means and said second computer means are network access computer means which communicate over said network using TCP/IP protocols.

12. (amended) A networked haptic feedback system as recited in claim 9 wherein said means for displaying an image includes means for displaying a graphical environment, wherein said graphical environment includes said visual information transferred from said first computer means to said second computer means.

13. (amended) A networked haptic feedback system as recited in claim 12 wherein said second computer means input comprises at least one of a position input for said human/computer interface device, and a button click input.

14. (amended) A networked haptic feedback system as recited in claim 9 wherein said human/computer interface means coupled to said second computer means includes a local controller means that communicates with said second computer means, a plurality of said actuator means for providing said physical feel sensations.

15. (amended) A networked haptic feedback system as recited in claim 14 wherein said second computer means sends a force feedback command to said local controller means that can be parsed by said local controller means such that said controller means can control said actuator means in response to said force feedback command in a control loop with said sensor means.

16. (amended) A method for providing haptic feedback between a first computer and a second computer, the first computer in communication with a first haptic feedback device providing computer-controlled tactile sensations to a first user of said first haptic feedback device, the second computer including a visual display and being in communication with a second haptic feedback device providing computer-controlled tactile sensations to a second user

of said second haptic feedback device, said first computer and said second computer communicating over a network, the method comprising:

receiving first computer information at said second computer from said first computer over said network;

enabling an image to be developed on said visual display of said second computer;

receiving input information at said second computer from said second haptic feedback device in response to manipulation of said second haptic feedback device by said user; and

causing a tactile sensation signal to be provided to said second haptic feedback device from said second computer, said haptic feedback tactile sensation signal being based on said first computer information from said first computer and said input information from said second haptic feedback device, wherein said haptic feedback signal causes said second haptic feedback device to output haptic feedback using an actuator of said second haptic feedback device.

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17. (amended) A method as recited in claim 16 wherein said first computer information includes input information from said first haptic feedback device representing a position of a user manipulatable object of said first haptic feedback device.

18. (amended) A method as recited in claim 17 wherein said first computer information includes haptic feedback information indicating a tactile sensation to be output by said second haptic feedback device.

19. A method as recited in claim 16 further comprising sending second computer information from said second computer to said first computer over said network.

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20. (amended) A method as recited in claim 19 wherein said second computer information includes said input information from said second haptic feedback device and haptic feedback information indicating a tactile sensation to be output by said first haptic feedback device.

21. (amended) A method as recited in claim 16 wherein said image includes displaying a first graphical object controlled by a user of said first haptic feedback device, and displaying a second graphical object controlled by a user of said second haptic feedback device.

22. A method as recited in claim 21 wherein said first and second graphical objects are paddles.

23. A method as recited in claim 21 wherein said first and second graphical objects are displayed in a web page.

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24. (amended) A method as recited in claim 16 wherein said first haptic feedback device includes an object representing a body part to be physically contacted by a user.

25. (amended) A method as recited in claim 16 wherein said second haptic feedback device includes a local controller that communicates with said second computer, wherein said local controller parses a haptic feedback command sent by said second computer such that said local haptic can control said actuator in response to said haptic feedback command in a control loop with at least one sensor of said second haptic feedback device.

26. (amended) A method for allowing two users to interact physically over a computer network, wherein a first manipulandum is physically contacted and moved by a first user in at least one degree of freedom and a second manipulandum is physically contacted and moved by a second user in at least one degree of freedom, the method comprising:

enabling first information to be transmitted including an indication of said movement of said first manipulandum over said computer network to said second manipulandum physically contacted by said second user;

causing a force to be applied to said second manipulandum based on said indication of movement of said first manipulandum such that said second user feels an interaction based on movement of said first manipulandum;

enabling second information to be transmitted including an indication of said movement of said second manipulandum over said computer network to said first manipulandum; and

causing a force to be applied to said first manipulandum based on said indication of movement of said second manipulandum such that said first user feels an interaction based on movement of said second manipulandum.

27. A method as recited in claim 26 wherein said first and second manipulandums are coupled to first and second computers, respectively, that are coupled to said computer network.

28. A method as recited in claim 27 further comprising developing an image on a visual display of said first and second computers, said image portraying a graphical environment at least partially responsive to said movement of said first manipulandum or said second manipulandum.

29. A method as recited in claim 28 wherein said graphical environment includes a first graphical object controlled by said first manipulandum and a second graphical object controlled by said second manipulandum, and wherein when said first and second graphical objects interact in said graphical object, forces are applied to said first manipulandum and said second manipulandum.

30. A method as recited in claim 27 wherein at least one of said first and second manipulandums represents a body part.

31. A method as recited in claim 27 wherein each of said first and second information includes feel sensation information indicating a type of force sensation to be output.

Please cancel claim 32 without prejudice.

33. (amended) A method as recited in claim 27 wherein said first manipulandum and said second manipulandum are each included in a haptic feedback device, said haptic feedback device including a local controller parsing commands from one of said first and second computers.

34. (amended) A method as recited in claim 33 wherein said haptic feedback devices each include at least one sensor for determining a position of said manipulandum of said haptic feedback device, and at least one actuator for outputting a force in a degree of freedom of said manipulandum of said haptic feedback device.

35. (amended) A method for providing haptic feedback between a first computer and a second computer, the first computer in communication with a first haptic feedback device providing computer-controlled physical haptic feedback to a first user of said first haptic feedback device, the second computer including a visual display and in communication with a second haptic feedback device providing computer-controlled physical haptic feedback to a second user of said second haptic feedback device, the method comprising:

sending first computer information to said second computer from said first computer over a network, wherein said first computer and second computer are in communication with said network;

causing a haptic feedback signal to be sent to said second haptic feedback device from said second computer, said haptic feedback signal being based on said first computer information, wherein said haptic feedback signal causes said second haptic feedback device to output forces to said second user using an actuator of said second haptic feedback device;

sending second computer information to said first computer from said second computer over said network; and

causing a haptic feedback signal to be sent to said first haptic feedback device from said first computer, said haptic feedback signal being based on said second computer information, wherein said haptic feedback signal causes said first haptic feedback device to output forces to said first user using an actuator of said first haptic feedback device.

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36. (amended) A method as recited in claim 35 wherein said first computer receives input information from said first haptic feedback device in response to manipulation of said first haptic feedback device by said first user, and wherein said second computer receives input information from said second haptic feedback device in response to manipulation of said second haptic feedback device by said second user.

37. (amended) A method as recited in claim 36 wherein said haptic feedback signal from said first and second computers is based on said input information from said first and second haptic feedback devices, respectively.

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38. (amended) A method as recited in claim 35 wherein said first computer information includes position information describing a position of a manipulandum of said first haptic feedback device, and wherein said second computer information includes position information describing a position of a manipulandum of said second haptic feedback device.

39. (amended) A method as recited in claim 38 wherein said first computer information includes haptic feedback information indicating a tactile sensation to be output by said second haptic feedback device, and wherein said second computer information includes haptic feedback information indicating a tactile sensation to be output by said second haptic feedback device.

40. A method as recited in claim 39 wherein said first and second computers each display a graphical environment having a first graphical object controlled by said first user and a second graphical object controlled by said second user.

41. A method as recited in claim 35 wherein said first and second computers communicate using a TCP/IP protocol.

42. A method as recited in claim 35 further comprising accessing a server computer with one of said first and second computers and downloading feel sensation information from said server computer, said feel sensation information to be included in said first computer information or said second computer information.

43. A method as recited in claim 42 wherein said server computer provides a web page downloaded to said computer accessing said server, said web page including embedded feel sensation information.

Please add the following claims:

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44. (new) A networked haptic feedback gaming system as recited in claim 1 wherein said first computer and said second computer communicate with at least one server over said network, wherein said information received from said first computer and said information received from said second computer are communicated via said server.

45. (new) A networked haptic feedback gaming system as recited in claim 1 wherein said image displayed in said second gaming environment includes a graphical object that can interact with a projectile.

46. (new) A networked haptic feedback gaming system as recited in claim 45 wherein said projectile includes a ball or puck.

47. (new) A networked haptic feedback gaming system as recited in claim 1 wherein said image displayed in said second gaming environment includes a graphical object having a location based on position information received from said second interface device, said graphical object able to collide with a different graphical object displayed in said second gaming environment, said different graphical object having a location based at least in part on said information received from said first computer.

48. (new) A networked haptic feedback gaming system as recited in claim 1 wherein said image displayed in said second gaming environment includes a graphical object having a location based on position information received from said second interface device, said graphical object able to collide with an obstruction displayed in said second gaming environment.

49. (new) A networked haptic feedback gaming system as recited in claim 9, wherein said second computer means receives position information from said first computer means over said network, said position information describing a position of a user manipulatable object of human/computer interface means included in said first computer means.

50. (new) A networked haptic feedback gaming system as recited in claim 9, wherein said position information describes a position of a body part.

51. (new) A method as recited in claim 16 wherein said first computer information includes information needed to update a simulated graphical object displayed by said second computer.

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52. (new) A method as recited in claim 19 wherein said second computer information includes information needed to update a simulated graphical object provided in an environment running on first computer.

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53. (new) A method as recited in claim 16 wherein said first computer provides said first computer information to a server computer in communication with said network, and wherein said server computer provides information based on said first computer information to said second computer.

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54. (new) A method as recited in claim 16 wherein said first computer provides said first computer information to a server computer in communication with said network, and wherein said server computer performs processing on said first computer information before sending said first computer information to said second computer.

55. (new) A method as recited in claim 16 wherein said first computer and said second computer receive information from a server computer in communication with said network.

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56. (new) A method as recited in claim 55 wherein said information received from said server is feel information describing at least one tactile sensation able to be output on said first haptic feedback device and said second haptic feedback device.

57. (new) A method for providing haptic feedback in a networked game between a first computer and a second computer at remote locations with respect to each other, the first computer communicating with a first haptic feedback device providing computer-controlled haptic feedback to a first user of said first haptic feedback device, the second computer communicating with a second haptic feedback device providing computer-controlled haptic feedback to a second user of said second haptic feedback device, the first computer and second computer both in communication with a server computer on a computer network, the method comprising:

receiving first computer information from said first computer at a server computer over said network;

providing said first computer information to said second computer, wherein said second computer uses said first computer information to update a game program running on said second computer, and wherein said second computer provides a second haptic feedback signal based at least in part on said first computer information to said second haptic feedback device, wherein said second haptic feedback device outputs tactile sensations to said second user based on said second haptic feedback signal;

receiving second computer information from said second computer at said server computer over said network; and

providing said second computer information to said first computer, wherein said first computer uses said second computer information to update a game program running on said first computer, and wherein said first computer provides a first haptic feedback signal based at least in part on said second computer information to said first haptic feedback device, wherein said first haptic feedback device outputs tactile sensations to said first user based on said first haptic feedback signal.

58. (new) A method as recited in claim 57 wherein said first computer information includes information that updates a simulated graphical object in said graphical environment running on said second computer, and wherein said second computer information includes information that updates a simulated graphical object in said graphical environment running on said first computer.

59. (new) A method as recited in claim 57 wherein said first computer information includes force information describing a tactile sensation, wherein said tactile sensation is output by said second haptic feedback device.

60. (new) A method as recited in claim 57 further comprising sending tactile sensation data stored on said server computer to said first computer.

61. (new) A method as recited in claim 57 wherein said first computer information includes position data allowing said second computer to display a graphical object in said graphical environment running on said second computer.

62. (new) A method as recited in claim 57 wherein said server computer runs a web page.

63. (new) A method as recited in claim 57 wherein updating said game program running on said first computer includes updating a location of a displayed player graphical object based at least in part on said second computer information.

64. (new) A method as recited in claim 57 wherein said updating of said game program running on said first computer includes updating a location of a projectile.

65. (new) A method as recited in claim 64 wherein said projectile is a ball or a puck.

66. (new) A method as recited in claim 63 wherein said displayed player graphical object represents a sporting object.

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67. (new) A method as recited in claim 66 wherein said displayed player graphical object includes a weapon.

68. (new) A method as recited in claim 63 wherein a collision between said player graphical object and a different graphical object is detected, and wherein said first haptic feedback signal is based at least in part on said detected collision.

69. (new) A method as recited in claim 68 wherein said different graphical object is a projectile.

70. (new) A method as recited in claim 68 wherein said different graphical object is an obstruction in said game environment.

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71. (new) A method for providing haptic feedback over a computer network, a first computer including a haptic feedback device providing computer-controlled tactile sensations to a user of said haptic feedback device, the first computer and a second computer in communication with each other over said computer network, the method comprising:

receiving information at said first computer from said second computer over said network, said information including haptic feedback information;

using said information to repeatedly update a visual display running on said first computer, and wherein said first computer repeatedly provides a haptic feedback signal based at least in part on said haptic feedback information to said haptic feedback device, wherein said haptic feedback device outputs a tactile sensation to said user based on said haptic feedback signal and correlated with said updated visual display; and

sending information from said first computer, said sent information received at said second computer over said network.

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72. (new) A method as recited in claim 71 wherein said first computer is a client computer and said second computer is a server computer.

73. (new) A method as recited in claim 71 wherein said first computer and said second computer are client computers.

74. (new) A method as recited in claim 71 wherein said information received from said second computer includes web page information.

75. (new) A method as recited in claim 71 wherein said information received from said second computer includes position information for a graphical object displayed by said second computer.

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76. (new) A method as recited in claim 73 wherein said haptic feedback device is a first haptic feedback device, and wherein said second computer includes a second haptic feedback device providing computer-controlled physical tactile sensations to a user of said second haptic feedback device.

77. (new) A method as recited in claim 71 wherein said information received from said second computer includes visual information depicting a body part.

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78. (new) A method as recited in claim 71 wherein said visual display is updated by moving a graphical object within a graphical game environment based on position data received from said haptic feedback device, where a collision between said graphical object and a different graphical object can be detected to cause said tactile sensation to be output.

79. (new) A method as recited in claim 71 wherein said first computer receives an indication of a gaming event in said information, said first computer synchronizing said visual display associated with said gaming event with said tactile sensation that is associated with said gaming event.

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80. (new) A method as recited in claim 79 wherein said gaming event is a collision.

81. (new) A method as recited in claim 79 wherein said gaming event is an explosion.

82. (new) A method as recited in claim 79 wherein said visual display is updated at a rate substantially faster than said tactile sensation.

83. (new) A haptic feedback device coupled to a host computer, said haptic feedback device generating tactile sensations based in part on information received over a network, the haptic feedback device comprising:

a user manipulatable object physically contacted and manipulated by a user and moveable in at least one degree of freedom;

an actuator operative to output said tactile sensations to said user;

at least one sensor operative to detect a position of said user manipulatable object in said at least one degree of freedom, wherein position data describing said detected position is

provided to said host computer to control a first graphical object displayed by said host computer in a graphical environment; and

a local controller, separate from and communicating with said host computer, and coupled to said actuator and said sensor, said local controller receiving haptic feedback data from said host computer, said haptic feedback data coordinating a tactile sensation to be output by said actuator with interaction between said first graphical object and a second graphical object displayed in a graphical environment by said host computer, wherein said haptic feedback data and a state of said displayed second graphical object are derived using said information received by said host computer from a different computer over said network.

84. (new) A haptic feedback device as recited in claim 83 wherein said information has been received by said host computer from a server machine connected to said network.

85. (new) A haptic feedback device as recited in claim 83 wherein said information has been received by said host computer from a client machine.

86. (new) A haptic feedback device as recited in claim 84 wherein said server machine and said host computer communicate over said network using TCP/IP protocols.

87. (new) A haptic feedback device as recited in claim 83 wherein said haptic feedback data includes at least one command, and wherein said local controller parses said command to control said actuator.

88. (new) A haptic feedback device as recited in claim 83 further comprising a button input device having a state responsive to manipulation by said user, wherein said state of said button input device is provided to said local controller and from said local controller to said host computer.

89. (new) A haptic feedback device as recited in claim 83 wherein movement of said user manipulatable object is used to control a position of said first graphical object in said graphical environment.

90. (new) A haptic feedback device as recited in claim 84 wherein said user manipulatable object is constrained to move in two planar degrees of freedom, wherein said actuator is a first voice coil actuator, and further comprising a second voice coil actuator, wherein said cursor is controlled by said user manipulatable object to select said displayed element on said web page.

91. (new) A method of enabling a multi-player networked computer-gaming simulation that provides tactile sensations to multiple users, the method comprising:

enabling the execution of said computer-gaming simulation on multiple client computers, each of said client computers being in communication with the Internet, wherein each of said client computers simultaneously executes a local model of said computer-gaming simulation and visually displays said computer-gaming simulation;

enabling at least one of said local models of said computer-gaming simulation to access an associated haptic feedback device connected to a particular one of said client computers running said local model, wherein said associated haptic feedback device includes a user manipulatable object moveable by a user, said movement tracked by sensors of said associated haptic feedback device, and wherein said local model receives position data from said associated haptic feedback device describing said movement and sends haptic feedback data to said associated haptic feedback device;

enabling a location of a first graphical object displayed in said computer-gaming simulation of said particular client computer to be updated based on said position data from said associated haptic feedback device;

enabling a location of a second graphical object displayed in said computer-gaming simulation of said particular client computer to be updated based, at least in part, on information received over said Internet, said information including or at least partially based on data originating from a different one of said client computers in communication with said Internet;

enabling said computer-game simulation of said particular client computer to determine if said first graphical object displayed on said particular client computer has collided with said second graphical object and determine a tactile sensation to be felt by said user of said particular computer if said collision has occurred; and

enabling said computer-game simulation to cause tactile data to be sent from said particular client computer to said associated haptic feedback device to output said tactile sensation.

92. (new) A method as recited in claim 91 wherein said local model of said particular client computer also receives button data from said associated haptic feedback device, said button data describing a state of at least one button on said associated haptic feedback device.

93. (new) A method as recited in claim 91 wherein said first graphical object is a representation of sporting equipment.

94. (new) A method as recited in claim 93 wherein said second graphical object is a representation of a ball or puck.

95. (new) A method as recited in claim 91 wherein said first graphical object includes a representation of a weapon.

96. (new) A method as recited in claim 91 wherein each of said local models of said computer-gaming simulation of said multiple client computers displays a graphical object having a location influenced by position data received from an associated interface device in communication with each client computer.

97. (new) A method as recited in claim 91 wherein said particular client computer receives an indication of a gaming event in said received information, said particular client computer synchronizing a visual display of said computer-gaming simulation associated with said gaming event with said tactile sensation that is associated with said gaming event.

98. (new) A method as recited in claim 91 wherein a sound is associated with an event occurring in said computer-gaming simulation, wherein said computer synchronizes the output of said sound with said tactile sensation that is associated with said event.

99. (new) A method as recited in claim 98 wherein said event is a collision in said computer-gaming simulation.

100. (new) A method as recited in claim 98 wherein said event is an explosion in said computer-gaming simulation.